

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

138. A method of identifying a compound that putatively enhances, inhibits, or elicits a bitter taste sensation in a human subject comprising:

(1) screening one or more compounds in a functional assay which identifies compounds that modulate (enhance or inhibit) or induce the activation of a T2R polypeptide selected from the group consisting of:

(a) a T2R polypeptide comprising an amino acid sequence contained in any one of SEQ. ID. NOS: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20 and 24;

(b) a functional fragment of a T2R polypeptide according to (a);

(c) a T2R polypeptide which exhibits at least 90% sequence identity with at least one T2R polypeptide having an amino acid sequence contained in any one of SEQ. ID. NOS: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, and 24; and

(d) a T2R polypeptide encoded by a nucleic acid sequence that specifically hybridizes under stringent hybridization condition to a T2R nucleic acid sequence selected from the group consisting of SEQ. ID. NOS.: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19 and 23; and

(2) identifying a compound as being one that putatively enhances, inhibits or elicits a bitter taste based on its effect on the activation of

at least one T2R polypeptide according to (a), (b), (c) or (d) in said functional assay (1).

139. The method of claim 138, wherein said T2R polypeptide has a sequence selected from those contained in SEQ. ID. NOS: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, and 24.

140. The method of claim 138, wherein said T2R polypeptide is encoded by a nucleic acid sequence selected from the group consisting of SEQ. ID. NOS: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19 and 23 or a fragment thereof that encodes a functional T2R polypeptide.

141. The method of claim 138, wherein the T2R polypeptide is encoded by a nucleic acid sequence that hybridizes to a nucleic acid sequence selected from the group consisting of SEQ. ID. NOS: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19 and 23 under stringent hybridization conditions.

142. The method of claim 138, wherein the T2R polypeptide exhibits at least 95% sequence identity to a polypeptide sequence contained in any one of SEQ. ID. NOS: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, and 24.

143. The method of claim 142, wherein said T2R polypeptide exhibits at least 95% sequence identity to at least one of said T2R polypeptides.

144. The method of claim 142, wherein said T2R polypeptide exhibits at least 98% sequence identity to at least one of said T2R polypeptides.

145. The method of claim 138, wherein said T2R polypeptide is expressed by a cell.

146. The method of claim 145, wherein said T2R polypeptide is expressed on the surface of said cell.

147. The method of claim 145, wherein said cell is a eukaryotic cell.
148. The method of claim 145, wherein said cell is a prokaryotic cell.
149. The method of claim 147, wherein said eukaryotic cell is a yeast, insect, amphibian or mammalian cell.
150. The method of claim 138, wherein said cell expresses a G protein that couples a to said T2R polypeptide.
151. The method of claim 150, wherein said G protein is  $G_{\alpha 15}$ ,  $G_{\alpha 16}$  or gustducin.
152. The method of claim 149, wherein said mammalian cell is a HEK-293, COS or CHO cell.
153. The method of claim 138, wherein said assay detects the effect of said compound on the phosphorylation of said T2R polypeptide.
154. The method of claim 138, wherein said assay detects the effect of said compound on arrestin translocation.
155. The method of claim 138, wherein said assay detects the effect of said compound on second messenger(s).
156. The method claim 154, wherein said second messenger is cAMP, cGMP or IP3.
157. The method of claim 138, wherein said assay includes at least one voltage-sensitive or calcium-sensitive dye.
158. The method of claim 138, which detects the effect of said compound on G protein activation by said T2R polypeptide.
159. The method of claim 158 wherein said G protein is  $G_{\alpha 15}$ ,  $G_{\alpha 16}$  or gustducin.

160. The method of claim 138, wherein said T2R polypeptide is stably expressed by a cell.

161. The method of claim 138, wherein said T2R polypeptide is transiently expressed by a cell.

162. The method of claim 138, wherein said assay is a fluorescence polarization or FRET assay.

163. The method of claim 138, wherein said assay detects the effect of said compound on the activation of cGMP phosphodiesterase.

164. The method of claim 158, wherein said assay detects the effect of said compound on adenylate cyclase activity.

165. The method of claim 138, wherein said assay is a GTP  $\gamma^{35}\text{S}$  assay.

166. The method of claim 138, wherein said assay detects changes in intracellular calcium.

167. The method of claim 166, which uses a calcium sensitive dye.

168. The method of claim 138, wherein the assay detects changes in ionic polarization of a cell or cell membrane that expresses said T2R polypeptide.

169. The method of claim 168, wherein said assay detects changes in current by a voltage-clamp or patch-clamp technique.

170. The method of claim 138, wherein the assay detects ligand dependent coupling of said T2R polypeptide with gustducin.

- 171. The method of claim 138, wherein the assay detects changes in intracellular cAMP or cGMP.

172. The method of claim 138, wherein the assay measures the effect of said compound on transmitter or hormone release.

173. The method of claim 138, wherein the assay detects the effect of said compound on the transcription of a polypeptide of interest.

174. The method of claim 138, wherein the assay detects the effect of said compound on phosphatidyl inositol hydrolysis.

175. The method of claim 138, wherein said T2R polypeptide has the sequence contained in SEQ. ID. NO: 2.

176. The method of claim 138, wherein said T2R polypeptide has the sequence contained in SEQ. ID. NO: 4.

177. The method of claim 138, wherein said T2R polypeptide has the sequence contained in SEQ. ID. NO: 6.

178. The method of claim 138, wherein said T2R polypeptide has the sequence contained in SEQ. ID. NO: 8.

179. The method of claim 138, wherein said T2R polypeptide has the sequence contained in SEQ. ID. NO: 10.

180. The method of claim 138, wherein said T2R polypeptide has the sequence contained in SEQ. ID. NO: 12.

181. The method of claim 138, wherein said T2R polypeptide has the sequence contained in SEQ. ID. NO: 14.

182. The method of claim 138, wherein said T2R polypeptide has the sequence contained in SEQ. ID. NO: 16.

183. The method of claim 138, wherein said T2R polypeptide has the sequence contained in SEQ. ID. NO: 18.

184. The method of claim 138, wherein said T2R polypeptide has the sequence contained in SEQ. ID. NO: 20.

185. The method of claim 138, wherein said T2R polypeptide has the sequence contained in SEQ. ID. NO: 24.